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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,778	10/20/2005	Tsukasa Taniguchi	056205.55926US	5729

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EXAMINER	
NGUYEN, TRAN N	

ART UNIT	PAPER NUMBER
2834	

MAIL DATE	DELIVERY MODE
12/07/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/523,778	Applicant(s) TANIGUCHI ET AL.	
	Examiner Tran N. Nguyen	Art Unit 2834	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 2-4,6,8,10 and 11 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 2-4,6,8,10 and 11 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 08 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

DETAILED ACTION

*Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 2-3, 4/2, 4/3 and 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tanako et al (US Pub. 20020074887)** in view of level of ordinary of a worker in the art.

**Tanako** discloses a rotating electric machine (figs 5-8) comprising: a stator (54) provided with a plurality of windings; a rotor core (52) rotatably fixed to a rotary shaft inside said stator; and a plurality of magnets (53 fig 5) disposed in slots formed in said rotor core, wherein said plurality of magnets are arranged such that, among those ones of said plurality of magnets constituting one magnetic pole, particularly three magnets constituting one magnet pole and the rotor having two magnet poles (**Tanako** para. [0047]) the magnet arranged on the magnetic pole end side is oriented to incline toward a magnetic pole center position, wherein:

among those ones of said plurality of magnets constituting one magnetic pole, the magnet arranged on the magnetic pole end side is oriented to incline toward the magnetic pole center

position such that an angle formed between said magnet and a line tangential to a point at which a straight line passing both the center of said rotary shaft and the center of said magnet crosses an outer circumferential surface of said rotor core (fig 5);

a circular arc passing the centers of the magnets among those ones of said plurality of magnets constituting one magnetic pole, which are arranged on the magnetic pole end sides, has a smaller diameter than a circular arc passing the center of the magnet there among arranged on the magnetic pole center side; and, said magnet is in the form of a simple flat plate.

**Tanako** substantially discloses the claimed invention, except for the limitations of the following:

*a circumferential angle occupied by those ones of said plurality of magnets constituting one magnetic pole is in the range of 150 to 165 degrees in terms of an electrical angle; and*

*the incline angle toward the magnetic pole center is in the range of 2 to 6 degrees.*

Those skilled in the art would understand that Tanako discloses the arrangement of the magnets to form magnet poles for essentially reducing cogging torque and vibrations caused by magnetic flux variations. This is the Tanako's important teaching about the magnet arrangement in the rotor.

Thus, based on the Tanako's essential teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the rotor by arranging to magnets of each rotor magnet pole so that a circumferential angle occupied by those ones of said plurality of magnets constituting one magnetic pole is in the range of 150 to 165 degrees in terms of an electrical angle; and the incline angle toward the magnetic pole center is in the range of 2 to 6 degrees, as in the claimed invention. Doing so would reduce more magnetic flux variations in order to further eliminate cogging torque and restrain vibrations caused. Also, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

3. **Claims 2-3, 4/2 4/3, 6, 8 and 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mikulic (US 5097166)** in view of **Gleghorn et al (US 4,922,152)** and level of ordinary of a worker in the art.

**Mikulic** discloses a rotating electric machine (figs 2-4) comprising: a stator (65) provided with a plurality of windings; a rotor core rotatably fixed to a rotary shaft inside said stator; and a plurality of magnets (64 figs 2-3) disposed in slots formed in said rotor core, wherein said plurality of magnets are arranged such that, among those ones of said plurality of magnets constituting one magnetic pole, particularly three magnets constituting one magnet pole and the rotor having two magnet poles, the magnet arranged on the magnetic pole end side is oriented to incline toward a magnetic pole center position, wherein

among those ones of said plurality of magnets constituting one magnetic pole, the magnet arranged on the magnetic pole end side is oriented to incline toward the magnetic pole center position such that an angle formed between said magnet and a line tangential to a point at which a straight line passing both the center of said rotary shaft and the center of said magnet crosses an outer circumferential surface of said rotor core (figs 2-3);

a circular arc passing the centers of the magnets among those ones of said plurality of magnets constituting one magnetic pole, which are arranged on the magnetic pole end sides, has a smaller diameter than a circular arc passing the center of the magnet there among arranged on the magnetic pole center side;

said slots are shaped such that slits are formed between adjacent two of said plurality of magnets; and, said magnet is in the form of a simple flat plate (figs 2-3).

**Mikulic** however does not discloses the following limitations:

*a magnet fixing material is sealed in said slits; and,*

*a circumferential angle occupied by those ones of said plurality of magnets constituting one magnetic pole is in the range of 150 to 165 degrees in terms of an electrical angle; and the incline angle toward the magnetic pole center is in the range of 2 to 6 degrees.*

Regarding a magnet fixing material is sealed in said slits, Gleghorn teaches a rotor having embedded magnets within respective slots that are shaped such that slits (22) are formed between adjacent two of said plurality of magnets, and a magnet fixing material is sealed in said slits, the fixing material is aluminum sealed in the slit (22) functions to fix the magnets in position and, more importantly, to increase the reluctance of the rotor at the location of the slit (22) so that the magnetic flux of the magnets is better directed from one pole to the other via the air gap.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the rotor by using a magnet fixing material and sealed in said slits, as taught by Gleghorn. Doing so would provide means to mechanically fix the magnets in position and, more importantly, to electrically increase the reluctance of the rotor at the location of the slit so that the magnetic flux of the magnets would be improved.

Regarding the angle range of the magnets arrangement, those skills in the art would understand that Mikulic discloses the arrangement of the magnets to form magnet poles for essentially reducing cogging torque and vibrations caused by magnetic flux variations. This is the important teaching about the magnet arrangement in the rotor.

Thus, based on this essential teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the rotor by arranging to magnets of each rotor magnet pole so that a circumferential angle occupied by those ones of said plurality of magnets constituting one magnetic pole is in the range of 150 to 165 degrees in terms of an electrical angle; and the incline angle toward the magnetic pole center is in the range of 2 to 6 degrees, as in the claimed invention. Doing so would reduce more magnetic flux variations in order to further eliminate cogging torque and restrain vibrations caused. Also, it has been held

that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Communication***

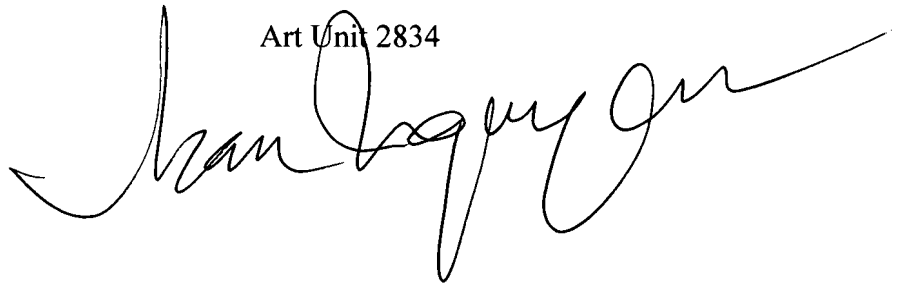
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran N. Nguyen whose telephone number is 571-272-2030. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. (Note: Use this **Central Fax number 571-273-8300 for all official response.**)

Do **not** use the Examiner's RightFax number without informing the Examiner first because, according to the USPTO policy, any document being sent via RightFax is treated as unofficial response and will not be officially dated until it is routed to the Central Fax.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tran N. Nguyen  
Primary Examiner  
Art Unit 2834

A handwritten signature in black ink, appearing to read 'Tran N. Nguyen', is written over the printed name and title.